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INDUCTION FURNACE FOR HIGH TEMPERATURE OPERATION

ABSTRACT OF THE DISCLOSURE

[00055] An induction furnace capable of operation at temperatures of over 3100°C has a cooling assembly **(60)**, which is selectively mounted to an upper end of the furnace wall **(76)**. The cooling assembly includes a dome **(62)**, which is actively cooled by cooling water coils **(68)**. During the cool-down portion of a furnace run, cooling initially proceeds naturally, by conduction of heat away from the hot zone through a furnace insulation layer **(58)**. Once the temperature within the furnace hot zone **(20)** reaches about 1500°C, a lifting mechanism **(80)**, mounted to the dome, raises a cap **(16)** of the furnace slightly, allowing hot gases from the hot zone to mix with cooler gas in the dome. This speeds up cooling of the hot zone, reducing cool-down times significantly, without the need for encumbering the furnace itself with valves or other complex cooling mechanisms which have to be replaced periodically. The life of a graphite furnace susceptor **(10)** at the high operating temperature is increased by surrounding the susceptor with a barrier layer **(40)** of flexible graphite, which inhibits evaporation of the graphite. Additionally, witness disks **(154)**, placed within the susceptor, provide an accurate temperature profile of the hot zone.